MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2018/2019

DCA5018 – ELECTRIC CIRCUITS

(Diploma in Electronic Engineering)

1 MARCH 2019
3.00 p.m – 5.00 p.m
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of **4** pages excluding the cover page with **4** questions.
2. Answer **ALL** questions. All necessary working steps must be shown.
3. Please write all your answers in the answer booklet provided.

QUESTION 1 [25 MARKS]

For the circuit shown in Figure 1, calculate the following:

a) Total resistance.

[5 marks]

b) Current I_1, I_2 and I_3. Prove that Kirchhoff's Current Law (KCL) is satisfied.

[11 marks]

c) Current flowing through each resistor.

[3 marks]

d) Voltage across each resistor.

[6 marks]

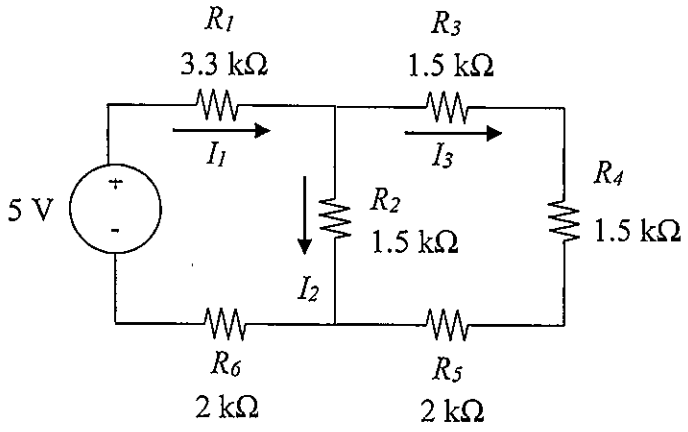

Figure 1

QUESTION 2 [25 MARKS]

a) For the circuit shown in Figure 2, calculate the Norton equivalent resistance (R_N) and Norton equivalent current (I_N) as seen by R_L.

[9 marks]

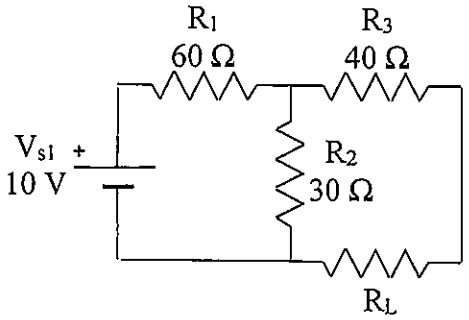

Figure 2

Continued...

b) For the circuit shown in Figure 3, using Mesh Current Analysis, calculate:

i) voltage drop across each resistor. [13 marks]

ii) power dissipated at resistor R_3 (P_{R3}). [3 marks]

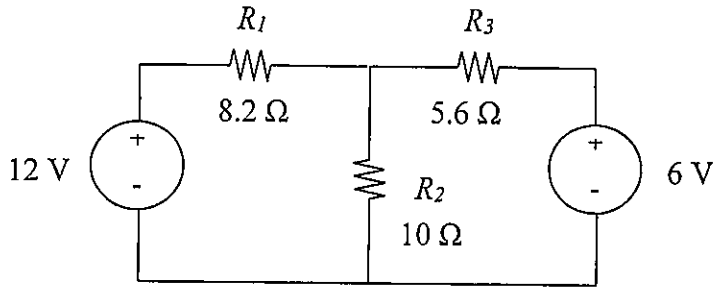

Figure 3

QUESTION 3 [25 MARKS]

By referring to the RL circuit as shown in Figure 4:

a) Convert the circuit from time domain to frequency domain.

[6 marks]

b) Calculate the total impedance in the circuit. Also sketch the impedance phasor diagram.

[7 marks]

c) Calculate the steady state current $i(t)$, $i_1(t)$, *and* $i_2(t)$ in the circuit.

[12 marks]

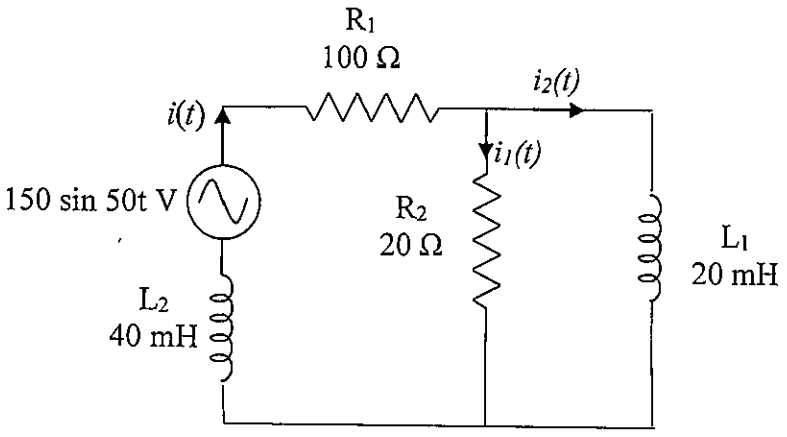

Figure 4

Continued...

QUESTION 4 [25 MARKS]

a) Fill in information in Table 1 below to indicate the manner in which series and parallel circuits differ.

	Series Circuit	Parallel Circuit
i) Resistance.		
ii) Voltage drop across each resistor.		
iii) Current flow across each resistor.		
iv) Advantage		
v) Disadvantage		

Table 1

[10 marks]

Continued...

b) Figure 5 shows a capacitor is charging,

i) Calculate how long it takes for the capacitor to reach full charge.

[3 marks]

ii) Fill up Table 2 and draw the graph for voltage versus time constant.

[12 marks]

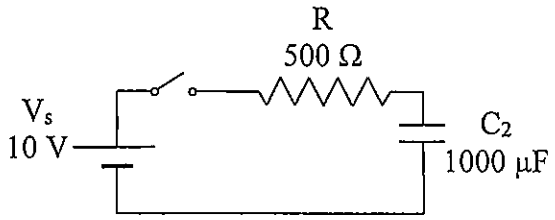

Figure 5

Time Constant	Percentage of voltage	Voltage across capacitor, V_c
0.5 time constant	39.30%	
1.0 time constant	63.20%	
2.0 time constants	86.50%	
3.0 time constants	95.00%	
5.0 time constants	99.30%	

Table 2

End of Page